

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the present application are respectfully requested in view of the remarks presented herewith.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1-4, 11 and 12 are pending in this application. Claims 5-10, 13 and 14 were withdrawn. Claims 1-3, 11 and 12 are rejected in the Non-Final Office Action mailed on February 2, 2009; claim 4 is objected to.

It is submitted that the claims, herewith and as originally presented, are patentably distinct over the prior art cited in the Office Action, and that these claims were in full compliance with the requirements of 35 U.S.C. § 112.

II. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1, 2, 11 and 12 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,147,404 to Pramanick et al (hereinafter "Pramanick") in view of U.S. Patent No. 6,731,006 to Halliyal et al (hereinafter "Halliyal").

Claim 3 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Pramanick in view of Halliyal and further in view of U.S. Patent No. 6,861,758 to Jan (hereinafter "Jan").

The rejections are traversed as set forth below.

Amended claim 1 recites, *inter alia*:

"... at least two wiring layers, each formed in a wiring groove formed in a corresponding insulating film; and

a via contact embedded in a via hole formed in an insulating film formed between the at least two layers and made of a metal wiring material which is the same as that of the at least two wiring layers,

wherein the metal wiring material of the via contact contains an additive which is not contained in the metal wiring materials of the at least two wiring layers ...” (emphasis added)

Applicants submit that the references cited in the Non-Final Office Action of February 2, 2009 do not teach all features of claim 1 including, “wherein the metal wiring material of the via contact contains an additive which is not contained in the metal wiring layer of the least two wiring layers.” Applicants agree with the Office Action that states that Pramanick “does not disclose an additive within the metal wiring of the via contact.” Thus Pramanick fails to teach or disclose the features of claim 1.

The Office Action further cites Halliyal as disclosing “an additive within the metal wiring material of the via contact.” However, Halliyal does not teach or suggest that such additive is not contained in two metal wiring layers.

The Office Action states that combined structure of Pramanick and Halliyal disclose the limitation of the “additive which is not contained in the metal wiring materials of the at least two wiring layers.”

Applicants respectfully disagree that it would have been obvious to combine Pramanick and Halliyal. Further, even if the references were combined, Applicants state the proposed modification is improper because such a modification as proposed in the Office Action would frustrate the purpose of the inventions of Pramanick and Halliyal.

The Office Action cites to Fig. 4 of Pramanick which, *inter alia*, discloses a via contact (202) surrounded on the top and bottom by a first and second channels or wiring layer (101, 204). As the Office Action states, Pramanick does not disclose an additive in the via contact. Pramanick expressly discloses using a **barrier layer** (125) to stop the electromigration between the first and second channels and the via. See Pramanick, column 4, lines 32-35.

By contrast, however, Halliyal as shown in various Figures, discloses a metal wiring material in via with additives introduced to form one or more metal layers within the via. More importantly Halliyal discloses a structure wherein the via at the bottom is adjacent a bottom metallization layer, with the top end of the via having a **conductive plug** formed inside the via region. The conductive plug at the top of the via further has an **exposed upper surface** (130). See column 8, lines 10-18. Halliyal does disclose a diffusion barrier level, but the barrier level only separates the via and bottom metallization layer. There is no barrier level surrounding the top of the via. Halliyal, in contrast to Pramanick, expressly operates in a multilayer structure wherein the via has a conductive plug with an exposed surface at one end and metallization layer at another end.

Therefore the incorporation of the via contact of Halliyal, or the use of additives disclosed in Halliyal into the different structure of Pramanick, is improper because Halliyal instead relies on the multi-metal layer feature of the via contact of Halliyal to prevent or reduce electromigration of copper or movement of copper atoms. See Halliyal, column 7, lines 6-9. By contrast, Pramanick does not teach or suggest the use of any multi-metal layers within the via, but discloses the use of barrier levels around the top and the bottom of the via.

Thus the semiconductor devices of Pramanick and Halliyal are meant to operate and/or be used in vastly different ways and/or settings. Therefore, the combination of two unlike and functionally different structures of Pramanick and Halliyal to arrive at the present invention as claimed is improper. MPEP 2143.01 states: "If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification."

Based on the foregoing reasons, Applicants submit that claim 1 is patentable. Independent claim 11 is similar in scope to claim 1 and therefore is also allowable.

III. DEPENDENT CLAIMS

Claims 2, 3 and 12 are dependent claims. Since the independent claims they depend from are not obvious from neither Pramanick nor Halliyal as set forth above, claims 2, 3, and 12 are not obvious, and hence, patentable. Claim 4, which was only objected to as being dependent on rejected claim 1, should also be patentable.

CONCLUSION

In view of the foregoing amendments and remarks, all of the claims in this application are in condition for allowance and Applicants respectfully request early passage to issue of the present application.

In the event the Examiner disagrees with any of the statements appearing above with respect to the disclosures in the cited references, it is respectfully requested that the Examiner specifically indicate the portions of the reference, or references, providing the basis for a contrary view.

Please charge any additional fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,
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